

Amendments to the Specification

Please replace paragraph [0011] with the following amended paragraph:

[0011] For a better understanding of the invention, and to show by way of example how the same may be carried into effect, reference is now made to the detailed description of the invention along with the accompanying figures in which corresponding numerals in the different figures refer to corresponding parts and in which:

FIGURE 1 illustrates a vehicle based data collection and processing system of the present invention;

FIGURE 1A illustrates a portion of the vehicle based data collection and processing system of FIGURE 1;

FIGURE 1B illustrates a portion of the vehicle based data collection and processing system of FIGURE 1;

FIGURE 2 illustrates a vehicle based data collection and processing system of FIGURE 1 with the camera array assembly of the present invention shown in more detail;

FIGURE 3 illustrates a camera array assembly in accordance with certain aspects of the present invention;

FIGURE 4 illustrates one embodiment of an imaging pattern retrieved by the camera array assembly of Figure 1;

FIGURE 5 depicts an imaging pattern illustrating certain aspects of the present invention;

FIGURE 6 illustrates an image strip in accordance with the present invention;

FIGURE 7 illustrates another embodiment of an image strip in accordance with the present invention;

FIGURE 8 illustrates one embodiment of an imaging process in accordance with the present invention;

FIGURE 9 illustrates diagrammatically how photos taken with the camera array assembly can be aligned to make an individual frame;

FIGURE 10 is a block diagram of the processing logic according to certain embodiments of the present invention;

FIGURE 11 is an illustration of lateral oversampling looking down from a vehicle according to certain embodiments of the present invention;

FIGURE 12 is an illustration of lateral oversampling looking down from a vehicle according to certain embodiments of the present invention;

FIGURE 13 is an illustration of flight line oversampling looking down from a vehicle according to certain embodiments of the present invention;

FIGURE 14 is an illustration of flight line oversampling looking down from a vehicle according to certain embodiments of the present invention;

FIGURE 15 is an illustration of progressive magnification looking down from a vehicle according to certain embodiments of the present invention;

FIGURE 16 is an illustration of progressive magnification looking down from a vehicle according to certain embodiments of the present invention;

FIGURE 17 is an illustration of progressive magnification looking down from a vehicle according to certain embodiments of the present invention; and

FIGURE 18 is a schematic of the system architecture according to certain embodiments of the present invention.

Please replace paragraph [0013] with the following amended paragraph:

[0013] A vehicle based data collection and processing system 100 of the present invention is shown in ~~Figure 1~~ Figures 1, 1A, and 1B. Additional aspects and embodiments of the present invention are shown in Figures 2 and 18. System 100 includes one or more computer consoles 102. The computer consoles contain one or more computers 104 for controlling both vehicle and system operations. Examples of the functions of the computer console are the controlling digital color sensor systems that can be associated with the data collection and processing system, providing the display data to a pilot, coordinating the satellite generated GPS pulse-per-second (PPS) event trigger (which may be 20 or more pulses per second), data logging, sensor control and adjustment, checking and alarming for error events, recording and indexing photos, storing and processing data, flight planning capability that automates the navigation of the vehicle, data, and providing a real-time display of pertinent information. A communications interface between the control computer console and the vehicle autopilot control provides the ability to actually control the flight path of the vehicle in real-time. This results in a more precise control of the vehicle's path than is possible by a human being. All of these functions can be accomplished by the use of various computer programs that are synchronized to the GPS PPS signals and take into account the various electrical latencies of the measurement devices.

Please replace paragraph [0014] with the following amended paragraph:

[0014] One or more differential global positioning systems 106 are incorporated into the system 100. The global positioning systems 106 are used to navigate and determine precise ~~flights~~ flight paths during vehicle and system operations. To accomplish this, the global positioning systems 106 are communicatively linked to the computer console 102 such that the information from the global positioning systems 106 can be acquired and processed without

flight interruption. Zero or more GPS units may be located at known survey points in order to provide a record of each sub-seconds' GPS satellite-based errors in order to be able to back correct the accuracy of the system 100. GPS and/or ground based positioning services may be used that eliminate the need for ground control points altogether. This technique results in greatly improved, sub-second by sub-second positional accuracy of the data capture vehicle.

Please replace paragraph [0016] with the following amended paragraph:

[0016] One or more one ~~or more~~ camera array assemblies 112 for producing an image of a target viewed through an aperture are also communicatively connected to the one or more computer consoles 102. The camera array assemblies 112, which will be described in greater detail below, provide the data collection and processing system with the ability to capture high resolution, high precision progressive scan or line scan, color digital photography.

Please replace paragraph [0020] with the following amended paragraph:

[0020] A complete flight planning methodology is used to micro plan all aspects of missions. The inputs are the various mission parameters (latitude/longitude, resolution, color, accuracy, etc.) and the outputs are detailed on-line digital maps and data files that are stored onboard the data collection vehicle and used for real-time navigation and alarms. The ability to interface the flight planning data directly into the autopilot is an additional integrated capability. A computer program may be used that automatically controls the flight path, attitude adjustments, graphical display, moving maps of the vehicle path, checks for alarm conditions and corrective actions, notifies the pilot and/or crew of overall system status, and provides for fail-safe operations and controls. Safe operations parameters may be constantly monitored and reported. Whereas the current system uses a manned crew, the system is designed to perform equally ~~will~~ well in an unmanned vehicle.

Please replace paragraph [0023] with the following amended paragraph:

[0023] The system 100 may also use highly fault-tolerant methods that have been developed ~~that provides~~ to provide a software inter-leaved disk storage methodology that allows one or two hard drives to fail and still not lose target data that is stored on the drives. This

software inter-leaved disk storage methodology provides superior fault-tolerance and portability versus other, hardware methodologies, such as RAID-5.

Please replace paragraph [0034] with the following amended paragraph:

Referring now to ~~Figure 2~~ Figure 4, images of areas 336, 328, 326, 332 and 340 taken by cameras 306 through 314, respectively, are illustrated from an overhead view. Again, because of the “cross-eyed” arrangement, the image of area 336 is taken by camera 306, the image of area 340 is taken by camera 314, and so on. In one embodiment of the present invention, images other than those taken by the center camera 310 take on a trapezoidal shape after perspective transformation. Cameras 306 through 314 form an array along axis 316 that is, in most applications, pointed down vertically. In an alternative embodiment, a second array of cameras, configured similar the array of cameras 306 through 314, is aligned with respect to the first array of cameras to have an oblique view providing a “heads-up” perspective. The angle of declination from horizontal of the heads-up camera array assembly may vary due to mission objectives and parameters but angles of 25-45 degrees are typical. Other alternative embodiments, varying the mounting of camera arrays, are similarly comprehended by the present invention. In all such embodiments, the relative positions and attitudes of the cameras are precisely measured and calibrated so as to facilitate image processing in accordance with the present invention.

Please replace paragraph [0069] with the following amended paragraph:

[0069] Figure 9 illustrates diagrammatically how photos taken with the camera array assembly may be aligned to make an individual frame. This embodiment shows a photo pattern illustration looking down from the Aircraft, using data ortho-rectified from five cameras.